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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/835,194	04/13/2001	Shigetsugu Okamoto	55807 (70904)	5343

21874 7590 08/06/2004

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EXAMINER	
SHAPIRO, LEONID	
ART UNIT	**PAPER NUMBER**
2673	19

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/835,194	Applicant(s) OKAMOTO ET AL.
	Examiner Leonid Shapiro	Art Unit 2673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 May 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9,11-16,18-28,30-38,40-48 and 50-61 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9,11-16,18-28,30-38,40-48 and 50-61 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-6, 9, 11-12, 14-15, 57-59, 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (US 5,546,134) in view of Tadashi (JP No. 06-006820) and Motomura et al. (US Patent No. 6,111,559).

As to claim 1, Lee teaches an image reproducing method for reproducing an image by a display apparatus having a plurality of pixels based on a picture signal including a pixel signal representing information of each pixel, comprising the steps of: performing an operation to obtain an average signal level which is an average level of all the pixel signals (See Fig. 5, items 20,10, in description See Col. 4, Lines 67-68 and Col.5, Lines 1-11), then, setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to the level of a pixel signal in accordance with the average signal level (See Fig.3, items y1,y2, in description See Col. 3, Lines 29-35); and reproducing an image so as to satisfy the input signal - output brightness property thus set (See Fig.4. items a, b, c, in description See Col.4, Lines 4-65).

Lee does not show maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level.

Tadashi teaches to use different correction memories in accordance with average signal level (See Drawings 1-3, items 12,14,16,30,32,34,40,44, in Detail Description See from page 3, paragraph 0016 to page 4, paragraph 0021). Tadashi teaches to select 1^{st} and 2^{nd} correction memories based on APL level (See Drawing 1, items 40 and 42) which will have higher (whiter) and lower (blacker) values for each pixel. Tadashi also teaches that 2 memories could be extended to 3 or more(n) memories (See in Detail Description page 4, paragraph 21). This extension pointed to reproduction the image so that maximum output brightness of a **pixel** of the display apparatus varies in accordance with the average signal level (APL).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Tadashi approach in the Lee method to reproduce the image so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

Lee and Tadashi do not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Lee and Tadashi system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claim 57, Lee teaches an average signal level operation section for performing an operation to obtain an average signal level is an average level of all the pixel signals (See Fig. 5, item 20, in description See Col. 5, Lines 4-6).

Lee does not show a picture signal compensation device receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels and a maximum output brightness adjustment section for performing compensation of the picture signal so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level.

Tadashi teaches a picture signal compensation device receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels (See Drawing 1, items R,G and B, in Detailed Description See page 1, paragraph 0001) and a maximum output brightness adjustment section for performing compensation of the picture signal so that maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level (See Drawings 1-2, items 40,42, in Detailed

description See from page 3, paragraph 0016 to page 4, paragraph 0021). . Tadashi also teaches that 2 memories could be extended to 3 or more(n) memories (See in Detail Description page 4, paragraph 21). This extension pointed to reproduction the image so that maximum output brightness of a **pixel** of the display apparatus varies in accordance with the average signal level (APL).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Tadashi approach in the Lee method in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

Lee and Tadashi do not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Lee and Tadashi system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claims 2, Lee teaches an image is reproduced so that an exponential value in which the input signal - output brightness property is approximately represented by an

exponential function becomes larger as the average signal level increases (See Fig. 3-4, item y1, in description See Col. 3, Lines 30-31 and Col.4, Lines 4-9).

As to claim 3, Lee teaches when the pixel signal includes a brightness signal representing brightness information of each pixel, the average signal level is obtained by performing an operation to obtain an average level of all the brightness signals (See Fig. 5, item 20, in description See Col. 5, lines 4-6).

As to claim 59, Lee teaches the average signal level is an average level of all the brightness signals each of which is included in the picture signal to be inputted and represents brightness information of each pixel (See Fig. 5, item 20, in description See Col. 5, lines 4-6).

As to claim 4, Lee teaches in order to reproduce the image based on the picture signal including a brightness signal subject to compensation, the input signal - output brightness property which represents variations in brightness of a pixel with respect to the level of the brightness signal is set in accordance with the average signal level, and compensation is performed on the brightness signal so as to satisfy the input signal - output brightness property thus set (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claim 5, Lee teaches the image is reproduced by performing compensation on the picture signal so as to satisfy the input signal -output brightness property that is set, and outputting the picture signal subject to compensation to the display apparatus (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claim 6, Lee teaches the input signal - output brightness property is set by performing an operation to obtain an exponential value in which the input signal - output bright property is approximately represented by an exponential function, and compensation for the picture signal is made by performing compensation of the picture signal according to an input signal - output brightness property corresponding to the input signal - output brightness property that is set, thereafter compensating for deviation from a linear property of the input signal -output brightness property of the display apparatus (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claims 9, 61 Tadashi teaches a color video signal including color component signals of three primary colors (See Drawing 1, items R, G and B).

As to claims 11, 58 Tadashi teaches a color video signal including color component signals of three primary colors (See Drawings 1-2, items 12,14,16,30,32,34,40,44, in Detail Description See from page 3, paragraph 0016 to page 4, paragraph 0021).

As to claim 12, Tadashi teaches to obtain the maximum output brightness of a pixel of the display apparatus is performed according to the average signal level (See Drawings 1-3, items 12,14,16,30,32,34,40,44, in Detail Description See from page 3, paragraph 0016 to page 4, paragraph 0021). Tadashi teaches to select 1st and 2nd correction memories based on APL level (See Drawing 1, items 40 and 42) which will have higher (whiter) and lower (blacker) values for each pixel. Tadashi also teaches that 2 memories could be extended to 3 or more(n) memories (See in Detail Description page 4, paragraph 21). This extension pointed to reproduction the image so that

maximum output brightness of a **pixel** of the display apparatus varies in accordance with the average signal level (APL) and Lee teaches the compensation according to the input signal-output brightness property that is set, based on a result of operation for the maximum output brightness (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claim 14 Tadashi teaches the image is reproduced so that an exponential value in which the input signal-output brightness property is approximately represented by an exponential function becomes larger as average signal level increases (See Drawing 2b), and the maxim output brightness becomes smaller as the average signal level increases (See Drawing 2d).

As to claims 15 Tadashi teaches a brightness signal which represents brightness information of each pixel (See Drawing 1, item 40, in Detailed Description See page 2, paragraph 0009).

2. Claims 16,18,38,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi et al. (US Patent No. 6,278,436) in view of Motomura et al.

As to claim 16, Hosoi et al. teaches an image reproducing method for reproducing an image by a display apparatus having a plurality of pixels based on a picture signal including a pixel signal representing information of each pixel, wherein: an image is reproduced so that, after performing an operation to obtain an average signal level which is an average level of all the pixel signals, maximum output brightness of a

pixel of the display apparatus varies in accordance with the average signal level (See Fig. 1-3, items 101-112, in description See Col.1, Lines 49-53 and Col. 7, Lines 47-68).

Hosoi et al. does not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Hosoi et al. system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claim 38, Hosoi et al. teaches an image reproducing apparatus which includes a display section having a plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel, comprising: an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals, maximum output brightness adjustment section for adjusting maximum output brightness of a pixel of the display apparatus varies in accordance with the average signal level (See Fig. 1-3, items 101-112, in description See Col.1, Lines 49-53 and Col. 7, Lines 47-68).

Hosoi et al. does not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Hosoi et al. system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claim 18, 40 Hosoi et al. teaches the pixel signal includes a brightness signal representing brightness information of each pixel, the operation for the average signal level is made by performing an operation to obtain an average level of all the brightness signals (See Fig. 1, items 101-103,105, in description See Col. 7, Lines 48-68).

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi et al. and Motomura et al. as applied to claim 16 above, and further in view of Tadashi.

Hosoi et al. and Motomura et al. do not show a color video signal including color component signals of three primary colors.

Tadashi teaches a color video signal including color component signals of three primary colors (See Drawing 1, items R, G and B).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement teaching of Hadashi into Hosoi et al., Motomura et al.system in order to improve the contrast (See Purpose in Tadashi reference).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Tadashi, Motomura et al. as aforementioned in claim 6 in view of Eglit (US Parent No. 5,734,362).

Lee and Tadashi, Motomura et al. do not show the compensation for deviation from the linear property of the input signal - output brightness property of the display apparatus is performed by converting the pixel signal by an inverse function of a function represents the input signal - output brightness property of the display apparatus.

Eglit teaches the compensation for deviation from the linear property of the input signal - output brightness property of the display apparatus is performed by converting the pixel signal by an inverse function of a function which represents the input signal - output brightness property of the display apparatus (See Fig. 1A-1C, in description See Col. 1, Lines 46-52).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Eglit approach in the Lee and Tadashi, Motomura et al. method in order implement exponential gamma removal (See Col. 1, line 60 of the Eglit reference).

6. Claims 8,22-28,30-33,35-37,42-48,50-56,60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee , Tadashi, Motomura et al. in view of Uehara et al. (US Patent No. 6,289,162 B1).

As to claim 22, Lee teaches an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals (See Fig. 5, item 20, in description See Col. 5, Lines 4-6); an input signal - output brightness property setting section for setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in accordance with the average signal level (See Fig. 5, item 30, in description See Col. 5, Lines 6-11); and a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal - output brightness property thus set (See Fig. 5, items 15,20.30, in description See Col. 5, Lines 1-11).

Lee does not show an image display apparatus includes a display section having plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel.

Tadashi teaches an image display apparatus includes a display section having plurality of pixels for displaying an image and receives a picture signal including a pixel signal representing information of each pixel (See Drawing 1, items R,G and B, in Detailed Description See page 1, paragraph 0001). Tadashi teaches to select 1st and 2nd correction memories based on APL level (See Drawing 1, items 40 and 42) which will have higher (whiter) and lower (blacker) values for each pixel. Tadashi also teaches that 2 memories could be extended to 3 or more(n) memories (See in Detail Description

page 4, paragraph 21). This extension pointed to reproduction the image so that maximum output brightness of a **pixel** of the display apparatus varies in accordance with the average signal level (APL).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Tadashi approach in the Lee method in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

Lee, Tadashi do not show a brightness signal represents brightness information of each pixel and chromaticity signal represents chromaticity information of each signal.

Uehara et al. teaches the luminance level and chromaticity level in image signal (See from Col. 2, Line 67 to Col. 3, Line 4).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Uehara et al. approach in the Lee, Tadashi method to employ a brightness signal which represents brightness information of each pixel and chromaticity signal which represents chromaticity information of each signal in order to provide image reproduction method and apparatus (See Col. 2, Lines 19-20 in Uehara et al. reference).

Lee, Tadashi, Uehara et al. do not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Lee, Tadashi, Uehara et al. system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claim 42, Lee teaches an average signal level operation section for performing an operation to obtain an average signal level which is an average level of all the pixel signals (See Fig. 5, item 20, in description See Col. 5, Lines 4-6); an input signal - output brightness property setting section for setting an input signal - output brightness property which represents variations in brightness of a pixel with respect to a level of the pixel signal in accordance with the average signal level (See Fig. 5, item 30, in description See Col. 5, Lines 6-11); and a signal compensation section for performing compensation of a picture signal so as to satisfy the input signal - output brightness property thus set (See Fig. 5, items 15,20.30, in description See Col. 5, Lines 1-11).

Lee does not show a picture signal compensation device receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels.

Tadashi teaches a picture signal compensation device receives a picture signal including a pixel signal representing information of each pixel, and performs compensation of the picture signal so as to output the pictures signal subject to compensation to a display apparatus having a plurality of pixels (See Drawing 1, items R,G and B, in Detailed Description See page 1, paragraph 0001). Tadashi teaches to select 1st and 2nd correction memories based on APL level (See Drawing 1, items 40 and 42) which will have higher (whiter) and lower (blacker) values for each pixel. Tadashi also teaches that 2 memories could be extended to 3 or more(n) memories (See in Detail Description page 4, paragraph 21). This extension pointed to reproduction the image so that maximum output brightness of a **pixel** of the display apparatus varies in accordance with the average signal level (APL).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Tadashi approach in the Lee method in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).
corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

Lee, Tadashi do not show a brightness signal represents brightness information of each pixel and chromaticity signal represents chromaticity information of each signal.

Uehara et al. teaches the luminance level and chromaticity level in image signal (See from Col. 2, Line 67 to Col. 3, Line 4).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Uehara et al. approach in the Lee, Tadashi method to employ a brightness signal which represents brightness information of each pixel and chromaticity signal which represents chromaticity information of each signal in order to provide image reproduction method and apparatus (See Col. 2, Lines 19-20 in Uehara et al. reference).

Lee, Tadashi, Uehara et al. do not show the image is reproduced so that the maximum output brightness becomes smaller as the average signal level increases.

Motomura et al. teaches the image is reproduced so that the maximum output brightness (in reference equivalent to the luminance of the backlight) becomes smaller as the average signal level (in the reference equivalent to the video signal level) increases (See Fig. 3, items 9, 12, 14, Col. 4, Lines 63-68 and Col. 6, Lines 35-51).

It would have been obvious to one of ordinary skill in the art in the time of invention to implement Motomura et al. teaching into Lee, Tadashi, Uehara et al. system in order not to deteriorate the image quality even when the video signal level is small (See Col. 1, Lines 60-63 in the Motomura et al. reference).

As to claims 23, 43 Lee teaches an image is reproduced so that an exponential value in which the input signal - output brightness property is approximately represented by an exponential function becomes larger as the average signal level increases (See Fig. 3-4, item y1, in description See Col. 3, Lines 30-31 and Col.4, Lines 4-9).

As to claims 24,44, Lee teaches when the pixel signal includes a brightness signal representing brightness information of each pixel, the average signal level is

obtained by performing an operation to obtain an average level of all the brightness signals (See Fig. 5, item 20, in description See Col. 5, lines 4-6).

As to claim 45 Lee teaches in order to reproduce the image based on the picture signal including a brightness signal subject to compensation, the input signal - output brightness property which represents variations in brightness of a pixel with respect to the level of the brightness signal is set in accordance with the average signal level, and compensation is performed on the brightness signal so as to satisfy the input signal - output brightness property thus set (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claims 25,47 Lee teaches the input signal - output brightness property is set by performing an operation to obtain an exponential value in which the input signal - output bright property is approximately represented by an exponential function, and compensation for the picture signal is made by performing compensation of the picture signal according to an input signal - output brightness property corresponding to the input signal - output brightness property that is set, thereafter compensating for deviation from a linear property of the input signal -output brightness property of the display apparatus (See Fig. 3-5, items y1,y2, in description See Col. 3, Lines 36-57).

As to claims 26,46 Lee teaches a delay section for delaying output of the pixel signal of the inputted picture signal to the signal compensation section by time required to perform the operation for the average signal level and to set the input signal-output brightness property (See Fig5, item 15, in description See Col. 5, Lines 42-49).

As to claims 27-28,48 Tadashi teaches the input signal output brightness property setting section sets the input signal-output brightness property by performing an operation to obtain an exponential value in which the input signal-output brightness property is approximately represented by an exponential function, in accordance with the average signal level (See Drawing 4, in Detailed Description See Page 1, paragraph 0002), and the signal compensation section includes a first signal compensation for performing compensation of the pixel signal according to an input signal-output brightness property corresponds to the input signal-output brightness property that is set, by an operation adopting the exponential value (See Drawings 1, 2, item 32), and a second signal compensation section for performing compensation for deviation from a linear property of the input signal-output brightness property of the display section (See Drawings 1,3, item 34), the second signal compensation section converts the pixel signal by an inverse function of a function representing the input signal-output brightness property of the display section (See Drawing 3, in Detailed Description See from page 3, paragraph 0016 to page 4, paragraph 0021).

As to claims 30,37,50 Tadashi teaches a color video signal including color component signals of three primary colors (See Drawing 1, items R, G and B).

As to claims 32,52, Tadashi teaches a color video signal including color component signals of three primary colors (See Drawings 1-2, items 12,14,16,30,32,34,40,44, in Detail Description See from page 3, paragraph 0016 to page 4, paragraph 0021).

As to claims 35,55 Tadashi teaches the image is reproduced so that an exponential value in which the input signal-output brightness property is approximately represented by an exponential function becomes larger as average signal level increases (See Drawing 2b), and the maxim output brightness becomes smaller as the average signal level increases (See Drawing 2d).

As to claim 56 Tadashi teaches a brightness signal which represents brightness information of each pixel (See Drawing 1, item 40, in Detailed Description See page 2, paragraph 0009).

As to claims 31,51 Tadashi teaches a maximum output brightness adjustment section for adjusting maximum output brightness of a pixel of the display section in accordance with the average signal level (See Drawings 1-3, items 12,14,16,30,32,34,40,44, in Detail Description See from page 3, paragraph 0016 to page 4, paragraph 0021).

As to claim 33,53 Tadashi teaches the image is reproduced so that an exponential value in which the input signal-output brightness property is approximately represented by an exponential function becomes larger as average signal level increases (See Drawing 2b), and the maxim output brightness becomes smaller as the average signal level increases (See Drawing 2d).

As to claims 8, 36, 60, Lee, Tadashi do not show a brightness signal represents brightness information of each pixel and chromaticity signal represents chromaticity information of each signal.

Uehara et al. teaches the luminance level and chromaticity level in image signal (See from Col. 2, Line 67 to Col. 3, Line 4).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Uehara et al. approach in the Lee, Tadashi, Motomura et al. method to employ a brightness signal which represents brightness information of each pixel and chromaticity signal which represents chromaticity information of each signal in order to provide image reproduction method and apparatus (See Col. 2, Lines 19-20 in Uehara et al. reference).

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi et al. and Motomura et al. as aforementioned in claim 16 in view of Uehara et al. (US Patent No. 6,289,162 B1).

Tadashi and Hosoi et al. do not show a brightness signal represents brightness information of each pixel and chromaticity signal which represents chromaticity information of each signal.

Uehara et al. teaches the luminance level and chromaticity level in image signal (See from Col. 2, Line 67 to Col. 3, Line 4).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Uehara et al. approach in the Motomura et al. and Hosoi et al. method to employ a brightness signal which represents brightness information of each pixel and chromaticity signal which represents chromaticity information of each signal in order to

provide image reproduction method and apparatus (See Col. 2, Lines 19-20 in Uehara et al. reference).

8. Claim 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Tadashi, Motomura et al. as aforementioned in claim 12 in view of Hosoi et al. (US Patent No. 6,278,436 B1).

Lee and Tadashi, Motomura et al. do not show an emission type optical switching element in which emission element function as an optical switching element as well.

Hosoi et al. teaches the plasma display panel which is an emission type optical switching element in which emission element function as an optical switching element as well (See Col. 1, Lines 13-19).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Hosoi et al. approach in the Lee and Tadashi, Motomura et al. method to employ a an emission type optical switching element in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

9. Claims 34,54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, Tadashi, Motomura et al. and Uehara et al. as aforementioned in claims 33, 51 in view of Hosoi et al. (US Patent No. 6,278,436 B1).

Lee, Tadashi and Uehara et al., Motomura et al. do not show an emission type optical switching element in which emission element function as an optical switching element as well.

Hosoi et al. teaches the plasma display panel which is an emission type optical switching element in which emission element function as an optical switching element as well (See Col. 1, Lines 13-19).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Hosoi et al. approach in the Lee, Tadashi and Uehara et al., Motomura et al. method to employ a an emission type optical switching element in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion and black level expansion corresponding respectively to a high APL and a low APL (See PURPOSE in Tadashi reference).

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee , Motomura et al. as aforementioned in claim 16 in view of Yamazaki et al (US Patent No. 6,399,960 B1).

Lee, Motomura et al. do not show a display apparatus having an emission element and non-emission type optical switching element.

Yamazaki et al. teaches the active matrix-type flat panel displays with EL units (See Col. 23, lines 50-53).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Yamazaki et al. approach in the Lee, Motomura et al. method in order to improve the contrast of a display picture on a liquid crystal display device by

implementing white level expansion corresponding respectively to a high APL (See PURPOSE in Tadashi reference).

10. Claim 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motomura et al. and Hosoi et al. as aforementioned in claims 38 in view of Yamazaki et al.

Motomura et al. and Hosoi et al. do not show a display apparatus having an emission element and non-emission type optical switching element.

Yamazaki et al. teaches the active matrix-type flat panel displays with EL units (See Col. 23, lines 50-53).

It would have been obvious to one of ordinary skill in the art in the time of invention to use Yamazaki et al. approach in the Motomura et al. and Hosoi et al. method in order to improve the contrast of a display picture on a liquid crystal display device by implementing white level expansion corresponding respectively to a high APL (See PURPOSE in Tadashi reference).

Response to Amendment

11. Applicant's arguments filed on 05-20-04 with respect to claim1-9, 11-16, 18-28, 30-38, 40-48, 50-61 have been considered but are moot in view of the new ground(s) of rejection.

Telephone inquire

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 703-305-5661. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703-305-4938. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Ls 07.28.04

VIJAY SHANKAR
PRIMARY EXAMINER